

# First International Workshop on Glass Fiber Reinforced Polymer (GFRP) Bar for Concrete Structures

## PRELIMINARY TECHNICAL PROGRAM

July 18, 2017, 8:00 to 17:30

Delta Hotel, Sherbrooke (Quebec) Canada

## ORGANIZERS

**Chair: Brahim Benmokrane**, Professor of Civil Engineering and Tier-1 Canada Research Chair, and NSERC/Industry Research Chair, University of Sherbrooke, QC, CANADA

**Co-Chair: Antonio Nanni**, Inaugural Senior Scholar Professor and Chair Dept. of Civil, Arch. & Environ. Engineering, University of Miami, FL, USA

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## MESSAGE FROM THE CHAIR AND THE CO-CHAIR

The deterioration of concrete infrastructure owing to corrosion of reinforcement steel is one of the major challenges facing the construction industry today. Worldwide, governments and industrial firms are looking for infrastructure systems that are stronger, last longer, are more resistant to corrosion and cost less to build and maintain. Engineers all over the world are searching for new and affordable construction materials as well as innovative approaches and systems to solve problems. As a result, in the last decade, there has been a rapid increase in using **innovative noncorrosive glass fiber-reinforced polymers (GFRP)** reinforcing bars for concrete structures due to enhanced properties and cost-effectiveness. The GFRP bars have been used extensively in different applications such as bridges, parking garages, water tanks, tunnels and marine structures in which the corrosion of steel reinforcement has typically led to significant deterioration and rehabilitation needs. Many significant developments from the manufacturer, various researchers and Design Codes along with numerous successful installations have led to a much higher comfort level and exponential use with designers and owners. After years of investigation and implementations, public agencies and regulatory authorities in North America have now included GFRP as **a premium corrosion resistant reinforcing material** in their corrosion protection specifications. Currently, Canadian Highway Bridge Design Code and the *AASHTO* LRFD Bridge Design Specifications contain design provisions for the design of concrete bridge members reinforced with FRP bars. As a result, over 400 bridges across Canada and USA have been designed and constructed using GFRP bars.

This workshop will provide a unique opportunity for end-users/DOT's, contractors, consultants, engineers firms, GFRP bar manufacturers, and researchers to **exchange up-to-date knowledge** on the use of GFRP bars in concrete structures (bridges, buildings, marine structures) including **challenges and opportunities**. The workshop consists of presentations by government authorities such as the Ministry of Transportation of Ontario, the Ministry of Transportation of Quebec, Florida Department of Transportation, and Texas Department of Transportation, consultants, GFRP manufacturers, researchers and open discussions.

**Topics and perspectives** of the workshop presentations:

1. End-User Perspective & Experience
2. North American Codes (CSA, ACI, and AASHTO), Standards, and Specifications Perspective
3. GFRP Bar Industry Overview & Future
4. Ongoing research and new applications

We would like to thank all participants – without them this workshop would not be successful.

Sincerely,

**Brahim Benmokrane, PhD, PE**  
**Chair**

Professor

*Canada Research Chair* in Advanced Composite Materials for Civil Structures

*NSERC/Industry Research Chair* in Innovative FRP Reinforcement for Concrete

Department of Civil Engineering

University of Sherbrooke

2500, Boulevard de l'Université

Sherbrooke, Quebec, Canada J1K 2R1

Phone: 819-571-6923

E-mail: [Brahim.Benmokrane@USherbrooke.ca](mailto:Brahim.Benmokrane@USherbrooke.ca)

**Antonio Nanni, PhD, PE**  
**Co-chair**

Inaugural Senior Scholar

Professor and Chair

Dept. of Civil, Arch. & Environ. Engineering

University of Miami

1251 Memorial Drive, McArthur Engineering Building, Rm. 325

Coral Gables, FL 33146-0630

Phone: 305-284-3461

E-mail: [Nanni@miami.edu](mailto:Nanni@miami.edu)

Tuesday July 18, 2017

**Session 1: Owner's Perspective on the  
Use of GFRP Bars**

8:00 - 10:30

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*Session Chairs:* **Brahim Benmokrane and Antonio Nanni**

8:00 *Brahim Benmokrane & Antonio Nanni* – Welcoming Remarks

8:10 *Sam Fallaha, Chase Knight, and Steve Nolan*, FDOT (Florida Department of Transportation) State Structures Design Office – **FDOT GFRP Implementation - Current Status, Projects, and Challenges**

8:50 *David Lai*, MTO (Ministry of Transportation Ontario) Head Bridges Rehabilitation Section, Bridge Office, Highway Standard Branch – **MTO's Policies, Projects, Specifications, and Practices for the Use of GFRP Bar**

9:10 *Darrell Evans*, PEI (Prince Edouard Island) Transportation, Infrastructure and Energy, Capital Projects Division – **Use of GFRP Bar in PEI Transportation and Infrastructure Projects**

9:30 *Tim Bradberry*, TxDOT (Texas Department of Transportation) Engineering Support Lead of Bridge Division, Bridge Design Section – **Past Use and Future Plans for GFRP Rebar in Texas Highway Construction**

9:50 *Steve Arsenault and Gérard Desgagné*, MTQ (Ministry of Transportation Quebec) Bridge Structures Department – **Quebec Current Status and Practices for the Use of GFRP Bar in Bridges**

10:10 *Bryan Hartnagel*, MoDOT (Missouri Department of Transportation) Bridge Division – **Use of GFRP Bar and Project Experiences in Missouri**

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**Session 2: Codes, Standards &  
Specifications Perspective on the use of GFRP Bars** 10:50 - 12:30

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*Session Chairs: Sam Fallaha and David Lai*

- 10:50 *William Gold*, BASF Corporation & Chair ACI 440 Committee – **Development of 440 H Design Code on Concrete Structures Reinforced with GFRP Bars and ASTM Specifications for Solid Round Glass Fiber Reinforced Polymer Bars for Concrete Reinforcement**
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- 11:10 *Brahim Benmokrane*, University of Sherbrooke – **Development of New Editions of CSA Standards Related to GFRP Bar**
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- 11:30 *Antonio Nanni*, University of Miami – **Trends and Standards Development for FRP bars in New Construction in the US**
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- 11:50 *Allan Manalo*, University of Southern Queensland – **Trends and Standards Development for GFRP as Internal Reinforcement in Australia**
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- 12: 10 *Emmanuel Ferrier*, University of Lyon 1 – **Trends and Development of Codes and Specifications on GFRP Bars for Concrete Structures in Europe**
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**Session 3: GFRP Bar Manufacturer's  
Installer's, & Supplier's Perspective**

13:30 - 15:15

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*Session Chairs: Tim Bradberry and Darrell Evans*

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- 13:30     *John Busel*, Vice-President, Composite Grow Initiative, American Composites Manufacturers Association – **FRP Rebar Manufacturers Council**
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- 13:45     *Amol Vaidya*, Global Innovation Leader, Owens Corning – **The Role of Glass Fibers & Sizing in the Glass-Fiber (GFRP) Rebar Applications**
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- 14:00     *Christian Witt*, General Manager, AGF Steel Inc (Ottawa Division) – **GFRP Experiences from the Point of View of the Rebar Fabricators/Installers**
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- 14:15     *Bernard Drouin*, President, Pultrall Inc– **Quality Assurance for Raw Materials and Quality Control of GFRP Bar Manufacturing**
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- 14:30     *Doug Gremel*, Director, FRP Composites Transportation Infrastructure, Hughes Brothers Inc – **Manufacturing Process Monitoring**
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- 14:45     *Dritan Topuzi*, Product Manager, Fiberline Composites Canada Inc – **GFRP Bar Testing for Enhanced Quality Control**
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- 15:00     *Joy Bennett*, Global Business Development Manager – Specialty Ashland Performance Materials – **Resin Manufacturing/QC for the GFRP Rebar Industry**
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**Tuesday July 18, 2017**

**Session 4: Ongoing Research and New Applications**

**15:30 - 16:50**

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*Session Chairs: John Myers and Steve Arsenault*

15:30 *Brahim Benmokrane, University of Sherbrooke – Driven Field Test of Precast Concrete Piles Reinforced with GFRP Bars*

15:50 *Antonio Nanni, University of Miami – Halls River Bridge*

16:10 *Mark Green, Queen's University – Fire Resistance of Concrete Slabs Reinforced with GFRP Bars*

16:30 *Lawrence Bank, City College of New York City – Are GFRP Reinforcements Sustainable?*

**Tuesday July 18, 2017**

**Closing Session**

**16:50 - 17:20**

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*Session Chairs: John Busel and William Gold*

16:50 Question and Answers

17:20 Closure of the Workshop

# Workshop – Registration

## Registration Form

**The organizing committee offers a free registration for this international event, but this registration is necessary to guarantee a seat and for the proper planning of the Workshop.**

Last name: ..... First name: .....  
Employer or organization: .....  
City: ..... Province or State: .....  
Postal or Zip Code: ..... Country: .....  
Phone: ..... Fax: .....  
E-mail: ..... Speaker: Yes  No

Please send the completed form by e-mail to:

[CDCC-2017@USherbrooke.ca](mailto:CDCC-2017@USherbrooke.ca)  
[Brahim.Benmokrane@USherbrooke.ca](mailto:Brahim.Benmokrane@USherbrooke.ca)